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Aluminium

(IPA: /ˌæljʊˈmɪniəm/, /ˌæljəˈmɪniəm/) or aluminum (IPA: /əˈluːmɪnəm/, see the "spelling" section below) is a silvery and ductile member of the poor metal group of chemical elements. It has the symbol Al; its atomic number is 13.

Aluminium is the most abundant of all metals and the third most abundant element in the Earth's crust, after oxygen and silicon. It makes up about 8% by weight of the Earth's solid surface, Aluminum is too reactive chemically to occur in nature as the free metal. Instead, it is found combined in over 270 different minerals [1]. The chief source of aluminum is bauxite ore. Aluminum is remarkable for its ability to resist corrosion (due to the phenomenon of passivation) and its light weight. Structural components made from aluminium and its alloys are vital to the aerospace industry and very important in other areas of transportation and building.

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13 magnesium	magnesium ← aluminium → silicon									
Al Ca Periodic table - Ex	ΔI: 13PA									
General										
Name, symbol, number	aluminium, Al, 13									
Chemical series	poor metals									
Group, period, block	13, 3, p									
Appearance	silvery									
Standard atomic weight	26.9815386(8) g·mol ⁻¹									
Electron configuration	[Ne] 3s ² 3p ¹									
Electrons per shell	2, 8, 3									
Physica	l properties									
Phase	solid									
Density (near r.t.)	2.70 g·cm ⁻³									
Liquid density at m.p.	2.375 g·cm ⁻³									
Melting point	933.47 K (660.32 °C, 1220.58 °F)									
Boiling point	2792 K (2519 °C, 4566 °F)									
Heat of fusion	10.71 kJ-mol ⁻¹									
Heat of vaporization	294.0 kJ·mol ⁻¹									
Heat capacity	(25 °C) 24.200 J·mol ⁻¹ ·K ⁻¹									
Vapor pressure										
P/Pa 1 10	100 1 k 10 k 100 k									
at T/K 1482 1632	1817 2054 2364 2790									
Atomic	properties									
Crystal structure	face centered cubic 0.4032 nm									
Oxidation states	3 (amphoteric oxide)									
Electronegativity	1.61 (Pauling scale)									

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Properties

Aluminium is a soft, lightweight metal with appearance ranging from silvery to dull gray, depending on the surface roughness. Aluminium is nontoxic, nonmagnetic, and nonsparking. The yield strength of pure aluminium is 7–11 MPa, while aluminium alloys have yield strengths ranging from 200 MPa to 600 MPa.^[2] Aluminium has about one-third the density and stiffness of steel. It is ductile, and easily machined, cast, and extruded.

Corrosion resistance is excellent due to a thin surface layer of aluminium oxide that forms when the metal is exposed to air, effectively preventing further oxidation. The strongest aluminium alloys are less corrosion resistant due to galvanic reactions with alloyed copper. [2]

Aluminium atoms are arranged in an FCC structure. Aluminium has a high stacking-fault energy of approximately 200 mJ/m². [3]

Aluminium is one of the few metals which retain full silvery reflectance in finely powdered form, making it an important component of silver paints. Aluminium mirror finish has the highest reflectance of any metal in the 200–400 nm (UV) and the 3000–10000 nm (far IR) regions, while in the 400–700 nm visible range it is slightly outdone by silver and in the 700–3000 (near IR) by silver, gold, and copper.

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Ionization energies			1st: 577.5 kJ·mol ⁻¹				
(more)			21	2nd: 1816.7 kJ·mol ⁻¹			
			3rd: 2744.8 kJ·mol ⁻¹				
Atomic radius			12	125 pm			
Atomic radius (calc.)				118 pm			
Covalent radius				118 pm			
Miscellaneous							
Magne	tic order	ring	paramagnetic				
Electrical resistivity			(20 °C) 26.50 n□·m				
Thermal conductivity			(300 K) 237 W·m ⁻¹ ·K ⁻¹				
Thermal expansion			(25 °C) 23.1 μm·m ⁻¹ ·K ⁻¹				
Speed of sound (thin rod)			(r.t.) (rolled) 5000 m·s ⁻¹				
Young	's modu	lus	70 GPa				
Shear	nodulus		26 GPa				
Bulk n	odulus		76 GPa .				
Poisson ratio			0.35				
Mohs hardness			2.75				
Vickers hardness			167 MPa				
Brinell hardness			245 MPa				
CAS registry number				7429-90-5			
		Selecte	d i	sotopo	15		
	Main	article: Iso	to	pes of	aluminium		
iso	NA	half-life		DM	DE (MeV)	DP	
	syn 7.17×10 ⁵ y			מ+	1.17	$^{26}{ m Mg}$	
²⁶ A1			,			²⁶ Mg	
		•			1.8086	• .	
²⁷ Al	100%	Al is stabl	le with 14 neutrons				
- References							

Aluminium is a good thermal and electrical conductor, by weight better than copper. Aluminium is capable of being a superconductor, with a superconducting critical temperature of 1.2 Kelvin.

Applications

General use

Whether measured in terms of quantity or value, the global use of aluminium exceeds that of any other metal except iron, and it is important in virtually all segments of the world economy.

Relatively pure aluminium is encountered only when corrosion resistance and/or workability is more

http://en.wikipedia.org/wiki/Aluminium

2007/09/07